

PERFORMANCE OF WEANER PIGS FED DIETS CONTAINING DIFFERENT PROPORTIONS OF DRIED CASSAVA PEELS AND WHOLE MAIZE.

P.E. NWAKPU, S.S.I. OMEJE AND B.I. ODO
Department of Animal Science and Fisheries
Ebonyi State University, Abakaliki

Target Audience: Animal nutritionists, feed millers, livestock producers.

ABSTRACT

Twenty - four hybrid (large white x landrace) weaner pigs between 50 - 60 days of age, averaging 8.5 ± 2.5 kg were used in a 70 day feeding trials to evaluate the performance of pigs fed dried cassava peels (DCP) and whole maize (wm) in various proportions. Diets 1,2,3 and 4 contained 50, 40, 30 and 20% and 0, 10, 20, and 30% wm respectively. Diet 1 was the control, with 50% dried cassava peels. The parameters measured were liveweight, feed intake, weight gain, feed conversion ratio (FCR), body length, height at withers and heartgirth measurements. Results indicated no significant ($P>0.05$) differences in the efficiency of feed utilization of the test diets even though, diet 4 had the best feed efficiency.

The control diet was superior to other test diets in their feed intake measurements. The body anthropometric measurements followed the same trend as in feed intake except in body weight which excelled in diet 4. In terms of economy and cost benefit, diet 3 was the cheapest followed by diets 1, 2, and 4. Dietary inclusion of DCP and wm at 30 and 20% respectively resulted in better economics of production. Diet 4, with high content of maize, had the best feed conversion efficiency but failed to induce the most profitable pig growth. Although, diet 3, with 30% DCP and 20% wm was less efficient in promoting growth, it was more cost effective and increased profitability because 30% DCP and 20% whole maize are cheaper than 50% dried cassava peels as ingredients for weaner pig rations.

Key words: (Dried cassava peels, whole maize, weaner pigs)

DESCRIPTION OF PROBLEM

It has been established that pig performance in terms of rate and efficiency of gain and carcass leanness is clearly related to the intake levels and therefore intake of particular nutrients, particularly energy and protein (1). However, feed stuffs and ingredients used in pig ration formulation such as maize, soyabean meal, groundnut cake etc. have continued to be scarce and costly due mainly to their low production and competition as food by human beings in Nigeria. This has caused the collapse of many small and large scale pig enterprises, discouraging prospective farmers and curtailing further expansion of small backyard piggeries. Nevertheless, the potential of many industrial by-product such as cassava peels, palm kernel meal, brewers spent grains

wheat offal etc. to serve as alternative, cheaper and readily available nutrient source for pigs has been recognised but not fully utilized.

It is in realisation of the above intention coupled with the increased capital and foreign exchange shortages, that commercial livestock farming and feed industries, are now trying to re-orient their operations towards greater reliance on locally available feedstuffs (2). Over the years cassava products have long been used as a major source of energy in place of cereal grains by both man and his livestock (3) it is not likely that, there would be a decrease in such competition even in the new millenium.

Now that pig production is becoming a preferred business as more people realise the potentials of pig business as quick source of animal protein, high litter size, short generation interval, high growth rate, high prolificacy, ability to convert kitchen waste into nutritious meat (4), there is every need to find ways of utilizing some of the domestic wastes like cassava peels in formulating swine diets.

This study was therefore, planned to determine the growth performance of weaner pigs fed diets containing dried cassava peels and whole maize in various proportions.

MATERIALS AND METHODS

The study was conducted at the piggery unit of Ebonyi State University, Abakaliki. The experimental site was a standard piggery house with open sides covered with nets, concrete floor and roofed with asbestos roofing sheets. Each pen measuring 2m x 7m with feeding, drinking and wallowing troughs. Twenty-four (largewhite x landrace) weaner pigs between 50 - 60 days of age with an average initial weight of 8.5 ± 1.25 kg were used. All the pigs were ear-notched for easy identification and they were all dewormed and bathed with asuntol prior to the commencement of experiment.

There were six pigs per treatment and each treatment replicated three times with two pigs per replicate. Four experimental diets were formulated with dried cassava peels and whole maize constituting up to 50% of the whole diet. The proportions of dried cassava peels were 50, 40, 30, and 20% and whole maize as 0, 10, 20 and 30% respectively, in diets 1, 2, 3, and 4. Diet 1 with 50% dried cassava peels and 0% whole maize was the control diet. Other ingredients used in the diets are shown in Table 1.

The cassava peels used were collected free at the various garri processing units scattered all-over Abakaliki capital city, sun dried for seven days (depending on the volume) to a constant weight before coarse grinding. Other feed ingredients were bought from the Abakpa main market. The main source of protein was toasted full-fat soyabean meal and fishmeal (fish dust). The proximate composition of the diets is shown in Table 1 which was determined using (5) method of analysis.

The experimental design used was completely randomised design (CRD). The pigs were fed twice daily, in the morning and in the evening. Feed intake was obtained as the difference between quantity offered and quantity left over. Water was offered *ad-libitum*. The pigs were weighed individually at the beginning of the experiment and subsequently on a weekly basis.

Table 1: Percentage composition of the experimental diets

Ingredients	Diets			
	1 (Control)	2	3	4
Dried Cassava peels	50	40	30	20
Whole Maize (white)	0	10	20	30
Palm Kernel Cake	15	15	15	15
Wheat bran	10	10	10	10
Full fat Soyabean Meal	15	15	15	15
Fishmeal (Fish dust)	5	5	5	5
Bone meal	4.0	4.0	4.0	4.0
Salt	0.5	0.5	0.5	0.5
Premix*	0.5	0.5	0.5	0.5
Total % Calculated	100.0	100.0	100.0	100.0
<i>Determined Analysis (% DM)</i>				
Dry matter	89.70	86.20	86.00	89.20
Crude Protein	20.30	20.70	20.95	20.94
Crude fibre	9.20	7.35	6.05	5.73
Ether Extract	5.20	6.20	7.20	7.80
Ash	6.90	7.80	8.20	8.80
Nitrogen free Extract	58.40	57.95	57.60	56.68
ME kcal/kg (Calculated)	2590	2610	2630	2650

*Roche vitamin prefix containing the following per kg: Vit A 9,600 I.U.; Vit D3 1,600 I.U.; Vit K 1.6mg; Vit B 1 0.9mg; Vit B2 3.2mg, Nicotinic acid 12.0mg, Vit B6 1.6mg, Vit B12 8.0mg; Folic acid 0.4mg; Biotin 0.6mg Choline Chloride 16.0mg, Manganese 8.0mg; Iron 4.0mg; Zinc 46.88mg; Copper 8.0mg, Iodine 0.48mg, Cobalt 0.28mg; and Selenium 0.01mg.

The parameters studied were liveweight, gain on a weekly basis, feed intake, Body length, heart girth and height at withers. The cost of ingredients at the time of purchase was used to calculate the total cost of feed per 100kg of the diet. All data collected were subjected to analysis of variance and differences among treatment means were separated using Duncan's multiple range test (DMRT) of (6)

RESULTS AND DISCUSSION

The summaries of the performance characteristics as affected by different proportion of dried cassava peels and whole maize in the diets are shown in Table 2. The feed intake data of diets 2, 3 and 4 were similar but the values were statistically ($P < 0.05$) lower than diet 1 (control). This may have been

due to high fibre content of the test diets (Table 1); which has been known to occur with dried cassava peels resulting in greater water intake.

Nevertheless, the growth performance criteria were not significantly ($P>0.05$) influenced by inclusion of dried cassava peels in the diet of weaner pigs up to 50 percent levels in the control diet. This is indicated in the weight gain (g) per pig per week even though, diet 2 tended to have higher weight gain. The same trend was observed in the feed conversion ratio which had diet 4 as the best, although, no statistical difference was observed among the test diets. (Table 2)

Table 2: Performance of weaner pigs on-differnt treatment diets.

Parameters	1 (Control)	2	3	4
Weekly weight gain(g) / pig	532 ± 0.31	561 ± 0.05	554 ± 0.61	495 ± 5.51
Feed Conversion ratio (FCR)	3.95	3.82	3.70	4.28
Feed cost/kg gain	9.05	9.11	9.01	10.00
Feed intake/day/pig	1.55 ± 0.03 ^a	1.35 ± 0.03 ^a	1.43 ± 0.03 ^b	1.33 ± 0.03 ^b

^{a, b}, Means in a row with different superscripts are significantly different ($P<0.05$)

The body anthropometric measurements like body length, heart/girth, height at withers and liveweight showed highly significant ($P<0.01$) differences among the test diet with diet 1 appearing to be the best in all the body parameters (Table 3), except for liveweight where diet 4 excelled the others.

Results indicated greater feed intake in the control diet of 50% dried cassava peels and 0% maize, portraying a lowered energy concentration of dried cassava peels than maize grains. This suggest a greater feed intake of the pigs in an attempt to meet-up with their metabolisable energy requirements by consuming more feed and perhaps drinking more water(7,8).

However, increased feed intake of pigs on control diet 1 was not accompanied by higher growth rate over and above other test diets. (9), suggesting that increased fibre content of diet depressed growth rate in pigs especially during periods of high temperature and this is prevalent in the tropics. Fibrousness, has also been reported by (10), as a feature of most locally available agro-industrial by-products and waste that limit their use. Again, the physical bulk may affect the overall retention time of digest in the gastro-intestinal tract and consequently, their utilization (11).

Table 3: Performance of body anthropometric measurements of the experimetal diets.

Parameters	1 (Control)	2	3	4
Body weight (kg)	22.01 ± 1.51 ^c	19.72 ± 0.72 ^d	22.40 ± 1.38 ^b	24.44 ± 0.87 ^a
Bosy length (cm)	97.63 ± 2.52 ^a	80.07 ± 1.98 ^c	97.37 ± 1.80 ^a	89.94 ± 2.38 ^b
Height at withers (cm)	50.0 ± 0.87 ^a	41.82 ± 1.07 ^d	48.38 ± 1.07 ^b	46.38 ± 2.38 ^c
Heartgirth (cm)	70.0 ± 1.67 ^a	59.92 ± 2.03 ^d	65.40 ± 0.87 ^c	68.14 ± 2.01 ^b

^{a, b, c, d} Means in a row with different superscripts are significantly ($p<0.05$) different

The observation of lack of significance of dietary treatments on rate and efficiency of weight gain agrees with the works of (12). These workers carried out a preliminary trial on the value of dried cassava peels, in which 13 % moist cassava peels at 40 - 50% of diet were fed to pigs and discovered no statistical differences in the live weight gain and feed conversion efficiency between low and high cassava diets.

These workers had earlier suggested greater digestibility of cassava based diets than cereal (maize) by pigs. Nevertheless, the rate and efficiency of gain was not commensurate with feed intake levels, and this goes to support the earlier opinion of (13), who upheld that, the efficiency of feed conversion in pigs has been found to be inversely related to increased feed intake levels because higher intake allows for increased body fat deposition and body fat deposition require more energy than protein (muscle) deposition for the same unit increase in body weight (14).

The significant differences observed among the pigs in the rate of development of the body anthropometric measurements like body weight, body length, height at withers and heartgirth, goes to point at the genotypes of the animals. Since, the experimental animals were hybrids of largewhite and landrace genotypes, differences in their body shapes and sizes were expected and could not be attributed solely to dietary treatments. Results also suggested further use of pure breeds in testing these feed ingredients. Also, environmental interaction on the rate of body development of these genotypes, would have been similar since these genotypes have been conferred some elements of adaptability in their environment. Generally, the best performance was obtained from diets four, three, one and two, in that order. This was indicated in their liveweight development which had significant differences observed in the treatment. The significant differences observed in the body weight development also agrees with (12); who replaced maize with moist cassava peel meal, and discovered that pigs on diets containing cassava peel meal grew slightly but not significantly faster and were slightly more efficient in feed conversion than pigs on diets with maize. The increase in the feed intake of diets high in cassava meal goes to confirm the positive trend observed in the rate of gain and efficiency. This is because, pigs tend to eat more and add more weight (fat), especially when the diets is diluted with fibrous feed ingredients (15)

The results of this study is a serious pointer that feeding dried cassava peels solely up to fifty percent can achieve equal or more positive effects than using high level of maize in diet of weaner pigs. This observation appears to be an encouraging venture considering the prohibitive costs of maize grains in our market today; one would have felt that, the best next energy-source is dried cassava peels. This is even more encouraging when one realizes that, these peels are wasted as by - products in most of our garri processing centres coupled with the pollution resulting from the decomposition of these peels around our homes, in towns, and cities.

Economics Analysis

Table 2 shows the economics of feeding dried cassava peels and whole maize to weaner pigs in different proportions. Even though the cost of feed per kg gain was not statistically different among the test diets, diet 3 had the least feed cost per kg gain followed by diets 1 (control) and 2, while diet 4 had the highest cost. It could also be observed that, diet 4 had the best feed conversion ratio, but the highest cost per kg gain, pointing that, an efficient feed conversion ratio is not a criteria for higher profit especially if this is obtained from costly diets. This observation reflects the real quality or production value of the test diets for growing pigs which is closely associated with feed utilization as reported by (16).

Despite the fact that, pigs on control diet consumed more of the relatively cheap diet, the diets could not effectively justify good growth. Although (17), reported that reducing feed cost was not only to obtain cheaper feed; but also dependent on production value. The result of this work justifies the fact that, huge financial returns would be made when weaner pigs are fed with dried cassava peels at 30% and 20% whole maize.

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